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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/816,055

03/31/2004

Shuxue Quan

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EXAMINER

DANIELS, ANTHONY J

ART UNIT

PAPER NUMBER

2622

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/816,055	Applicant(s) QUAN, SHUXUE	
	Examiner Anthony J. Daniels	Art Unit 2622	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/31/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claim 6 is objected to because of the following informalities: Claim states, "...the second first filter..." The examiner will interpret the claim as if "first" is omitted. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1,3-5,7,8 are rejected under 35 U.S.C. 102(b) as being anticipated by Tani (US # 5,379,069) – first interpretation.

As to claim 1, Tani teaches a digital imaging system (Figure 1) comprising: a first imaging sensor (Figure 1, CCD "15"); a second imaging sensor (Figure 1, CCD "14"), the second imaging sensor coupled to the first imaging sensor (Col. 2, Lines 24-27); a first filter coupled to the first imaging sensor (Figure 2B, complementary color filter "52"), wherein the first filter filters light at a first set of wavelengths (Figure 2B, cyan, magenta, yellow and green); and a second filter coupled to the second imaging sensor (Figure 2A, infrared cut filter "51"), wherein the second filter filters light at a second set of wavelengths (Figure 2A; *The IR cut filter*

*filters all visible light wavelengths; thus, at least red and blue would be filtered.})), the first set of wavelengths being different from the second set of wavelengths (Red and Blue different from cyan, magenta, yellow and green.).*

As to claim 3, Tani teaches the digital imaging system of claim 1, wherein the first imaging sensor is a charge coupled device (CCD) or a complementary metal-oxide semiconductor (Col. 2, Lines 21-24).

As to claim 4, Tani teaches the digital imaging system of claim 1, wherein the second imaging sensor is a charge coupled device (CCD) or a complementary metal-oxide semiconductor (Col. 2, Lines 21-24).

As to claim 5, Tani teaches the digital imaging system of claim 1, wherein the first filter is a trichromatic filter (Figure 2B, cyan, magenta and yellow).

As to claim 7, Tani teaches the digital imaging system of claim 1, wherein the first filter provides for three imaging channels (Figure 2B, cyan, magenta and yellow).

As to claim 8, Tani teaches the digital imaging system of claim 1, wherein the first filter provides for four imaging channels (Figure 2B, cyan, magenta, yellow and green).

2. Claims 1,6 and 9-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tani (US # 5,379,069) – second interpretation.

As to claim 1, Tani teaches a digital imaging system (Figure 1) comprising: a first imaging sensor (Figure 1, CCD “14”); a second imaging sensor (Figure 1, CCD “15”), the second imaging sensor coupled to the first imaging sensor (Col. 2, Lines 24-27); a first filter coupled to the first imaging sensor (Figure 2A, infrared cut filter “51”), wherein the first filter

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filters light at a first set of wavelengths (Figure 2A; *{The IR cut filter filters all visible light wavelengths; thus, at least red and blue would be filtered.}*); and a second filter coupled to the second imaging sensor (Figure 2B, complementary color filter “52”), wherein the second filter filters light at a second set of wavelengths (Figure 2B, cyan, magenta, yellow and green), the first set of wavelengths being different from the second set of wavelengths (*Red and Blue different from cyan, magenta, yellow and green.*).

As to claim 6, Tani teaches the digital imaging system of claim 1, wherein the second filter is a trichromatic filter (Figure 2B, cyan, magenta and yellow).

As to claim 9, Tani teaches the digital imaging system of claim 1, wherein the second filter provides for three imaging channels (Figure 2B, cyan, magenta and yellow).

As to claim 10, Tani teaches the digital imaging system of claim 1, wherein the second filter provides for four imaging channels (Figure 2B, cyan, magenta, yellow and green).

As to claim 11, Tani teaches the digital imaging system of claim 1, wherein the second filter provides for two imaging channels (Figure 2B, cyan and green).

As to claim 12, Tani teaches the digital imaging system of claim 1, wherein the second filter provides for one imaging channel (Figure 2B, cyan).

3. Claims 1,2,13-21 and 25-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Noguchi (US # 6,885,394).

As to claim 1, Noguchi teaches a digital imaging system (Figure 4) comprising: a first imaging sensor; a second imaging sensor, the second imaging sensor coupled to the first imaging sensor; a first filter coupled to the first imaging sensor, wherein the first filter filters light at a

first set of wavelengths; and a second filter coupled to the second imaging sensor, wherein the second filter filters light at a second set of wavelengths, the first set of wavelengths being different from the second set of wavelengths (Col. 7, Lines 34-41).

As to claim 2, Noguchi teaches the digital imaging system of claim 1 further comprising: a processor to calculate a surface reflectance of an object based on the first set of wavelengths and the second set of wavelengths (Col. 6, Line 58 – Col. 7, Line 25).

As to claim 13, Noguchi teaches a digital imaging apparatus comprising: a first means for capturing colorimetric information; a second means for capturing colorimetric information, the first means for capturing colorimetric information coupled to the second means for capturing colorimetric information; a first means for filtering coupled with the first imaging sensor means, wherein the first means for filtering to filter light at a first set of wavelengths; and a second means for filtering coupled with the second imaging sensor means, wherein the second means for filtering to filter light at a second set of wavelengths, the first set of wavelengths being different from the second set of wavelengths (Col. 7, Lines 34-41).

As to claim 14, Noguchi teaches the digital imaging apparatus of claim 13 further comprising: a means for processing to calculate a surface reflectance of an object based on the first set of wavelengths and the second set of wavelengths (Col. 6, Line 58 – Col. 7, Line 25), the means for processing coupled with the first means for capturing colorimetric information and the second means for capturing colorimetric information (Figure 4).

As to claim 15, Noguchi teaches a machine-readable medium having instructions to cause a machine to perform a method, the method comprising: receiving a first set of wavelengths

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of light (Figure 2, filter plate “22”; wavelengths 1-4; Figure 3); receiving a second set of wavelengths of light (Figure 2, filter plate “22”; wavelengths 5-8; Figure 3); and processing the first set of wavelengths and the second set of wavelengths to calculate a surface reflectance of an object (Col. 7, Lines 1-25).

As to claim **16**, Noguchi teaches the machine-readable medium of claim 15, wherein the first set of wavelengths provides three imaging channels (Figure 2, wavelengths 1-3).

As to claim **17**, Noguchi teaches the machine-readable medium of claim 15, wherein the first set of wavelengths provides four imaging channels (Figure 2, wavelengths 1-4).

As to claim **18**, Noguchi teaches the machine-readable medium of claim 15, wherein the second set of wavelengths provides three imaging channels (Figure 2, wavelengths 5-7).

As to claim **19**, Noguchi teaches the machine-readable medium of claim 15, wherein the second set of wavelengths provides four imaging channels (Figure 2, wavelengths 5-8).

As to claim **20**, Noguchi teaches the machine-readable medium of claim 15, wherein the second set of wavelengths provides one imaging channel (Figure 2, wavelength 5).

As to claim **21**, Noguchi teaches the machine-readable medium of claim 15, wherein the second set of wavelengths provides two imaging channels (Figure 2, wavelengths 5 and 6).

As to claims **25-31**, claims 25-31 are method claims corresponding to the apparatus claims 15-21, respectively. Therefore, claims 25-31 are analyzed and rejected as previously discussed with respect to claims 15-21, respectively.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 22,24,32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (US # 6,885,394) in view of Vilaseca et al. (attached NPL).

As to claims **22** and **24**, Noguchi teaches the machine-readable medium of claim 15. The claim differs from Noguchi in that it further requires that the calculation of the surface reflectance include performing principal component analysis and Wiener estimation.

In the same field of endeavor, Vilaseca teaches an estimation of spectral reflectance wherein Wiener inverse estimation and principal component analysis is used to calculate spectral reflectance (p. 1789, 2<sup>nd</sup> paragraph). In light of the teaching of Vilaseca, it would have been obvious to include these estimation algorithms in the calculation of spectral reflectance in the system of Noguchi, because an artisan of ordinary skill in the art would recognize that this would allow for an efficient way to achieve reproduced color.

As to claims **32** and **34**, claims 32 and 34 are method claims corresponding to the apparatus claims 22 and 24, respectively. Therefore, claims 32 and 34 are analyzed and rejected as previously discussed with respect to claims 22 and 24, respectively.

2. Claims 23 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (US # 6,885,394) in view of Arai (US # 5,864,834).



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As to claim **23**, Noguchi teaches the machine-readable medium of claim 15. The claim differs from Noguchi in that it further requires that the calculation of the surface reflectance include performing independent component analysis.

In the same field of endeavor, Arai teaches the use of independent analysis of illuminants to achieve spectral reflectance (Col. 2, Line 7-15). In light of the teaching of Arai, it would have been obvious to one of ordinary skill in the art to include this algorithm in the calculation of spectral reflectance in the system of Noguchi, because one of ordinary skill in the art would recognize that this would ensure that the reproduced color matches the color of the original image (see Arai, Col. 2, Lines 7-15)

As to claims **33**, claims 33 is a method claim corresponding to the apparatus claim 23. Therefore, claim 33 is analyzed and rejected as previously discussed with respect to claim 23.

### ***Conclusion***

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Daniels whose telephone number is (571) 272-7362. The examiner can normally be reached on 8:00 A.M. - 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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